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EXAMINER

GUPTA, VANI

ART UNIT

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3777

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/551,885	OMI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	VANI GUPTA	3777	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 September 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11,13-19,21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11,13-19,21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 1. Claims 1 – 10, 21, and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

**Claim 1** indicates that a composite image is formed by composing said tomogram and at least one of the following images: an operated image obtained by performing an inter-image operation on said functional images together and a blended image obtained by composing two or more of said operated image and said functional images together. However, the display part is required to still display the operated image and said composite image, along with other images. It seems that while Applicant has amended the claim to refer to “a blended image” in line 15, Applicant forgot to update the term in line 19, where the term “composite image” is still recited.

Claim 1 is also includes – in the last paragraph of the claim – inconsistent terminology - when referring to “portions” or “regions” of functional image data. In the last paragraph, line two indicates that “at least portions [or one part] of the regions in said functional image.” However, when referring to “other” parts of the same functional image data, line 4 indicates “other regions.” Then, in the last line, the claim again refers to “said portions.” It is not clear exactly what segments, or portions or regions, of the functional images are being set apart from each other, because as the claim is currently written, the “portions” are smaller segments of the

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“regions” of the images, which seem to be only bigger segments of the functional image as a whole. An appropriate correction to the terminology is required.

**Claim 21** is rejected for similar issues as well. Claims 2 – 10 and 22 are rejected for being dependent on Claim 21 and for not further limiting or clarifying claim 21 in this regard.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**2. Claims 1 – 11, 13 – 19, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wintermark et al. (US 6,792,302 B2) in view of Hossack (US 6,116,244).**

**Regarding Claim 1**, Wintermark discloses an apparatus for displaying image, said apparatus comprising:

an acquisition part configured to collect CT or MR head image data, or raw data such as “x-rays” (**fig. 7**; col. 4, line 48 – col. 5, line 12);

a tomogram forming part configured to form a tomogram from said CT or MR head image data (“CT image” or “tomogram;” col. 5, ll. 10 – 12);

an analysis part configured to calculate at least one biological function data in said tomogram, formed based on said CT or MR head image data, regarding temporal changes in values of the same pixels or section of an organ with passage of time (col. 5, ll. 27 – 64);

a functional image forming part configured to form at least one functional image based on said biological function data (“penumbra map,” col. 5, ll. 40 – 46);

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a composite image forming part configured to form a composite image by composing said tomogram and at least one of the following images:

an operated image obtained by performing an inter-image operation on said functional images together (col. 5, ll. 51 – 53),

blended image obtained by composing two or more of said operated image and said functional images together (col. 5, ll. 58 – 60); and

a display part **(6d)** configured to display said functional image, said operated image, said tomogram and said composite image; wherein at least portions of the regions in said functional image and in said operated image are displayed using red-green-blue (RGB) color scheme to represent the biological function data, and said portions of the regions in the functional image are displayed by an overlapped display (col. 13, line 60-col. 14, line 21), regarding penumbra (green) regions (i.e. first ROI regarding ischemia) and infarct (red) regions (i.e. second ROI regarding low blood flow) (column 5, lines 3 - 7; column 9, lines 24-34; **Figures 1a-f**)

However, Wintermark differs from Claim 1 in that Wintermark does not specifically display the aforementioned images using different gradation color scales corresponding to the evaluated value of said biological function data, and other regions in said function image and in said operated image are displayed in an arbitrary color which is not included in said gradation color scales, or are displayed transparently.

Nonetheless, Hossack suggests using different gradation color scales corresponding to the evaluated value of said biological function data (col. 2, line 65 – col. 3, line 17), based on the interaction of ultrasonic energy with blood perfusion; and and other regions in said function

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image and in said operated image are displayed in an arbitrary color which is not included in said gradation color scales, or are displayed transparently (col. 5, line 5 - col. 5, line 19).

It would have been obvious to one of ordinary skill in the art, having Wintermark and Hossack before one at the time of the invention was made, to modify the biological function image data generation and displaying teachings of Wintermark with the color gradation and transparency display scheme teachings of Hossack so that one could obtain sound diagnosis with better “clinical evaluation of the patient,” as suggested by Hossack (col. 9, line 43 – 47).

**Regarding Claim 21,** Wintermark in view of Hossack suggests a functional image display apparatus comprising:

an acquisition part configured to collect CT or MR head image data of a person being examined;

a tomogram forming part configured to form a tomogram from the CT or MR head image data;

an analysis part configured to calculate at least one biological function data in said tomogram, formed based on said CT or MR head image data, regarding temporal changes in values of the same pixels or section of an organ with passage of time;

a functional image forming part configured to form at least one functional image based on the biological function data;

a composite image forming part configured to form a composite image by composing the tomogram and at least one of the functional image, an operated image obtained by performing an inter-image operation on a plurality of functional images, and a blended image obtained by

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composing the functional images together; and a display part configured to display the functional image, the operated image, the tomogram and the composite image;

wherein at least portions of regions in the functional image and in the operated image are displayed using different gradation color scales corresponding to the evaluated value of the biological function data;

wherein other regions in the functional image and in the operated image are displayed in an arbitrary color which is not included in the gradation color [[scale]] scales, or are displayed transparently; and

wherein the portions of the regions in the functional image are displayed by an overlapped display (see rejection of Claim 1).

**Regarding Claim 2**, Wintermark suggests an apparatus according to claim 21, wherein said composite image is displayed by any one of a parallel display or a partial display (**figs. 1a – 1f**).

**Regarding Claim 3**, Wintermark in view of Hossack suggests an apparatus according to claim 21, wherein said functional image forming part sets to zero a ratio (i.e, displaying images as transparent images) of said functional image in other regions in said functional image (see rejection of Claim 1; and col. 3, ll. 15 - 17).

**Regarding Claim 4**, Wintermark in view of Hossack suggests an apparatus according to claim 21, wherein said functional image forming part arbitrarily varies the gradation color scale allocated to said biological function data (see rejection of claims 1 and 21).

**Regarding Claim 5**, Wintermark in view of Hossack suggests an apparatus according to claim 21, wherein said functional image forming part arbitrarily set ratios of the functional

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images in said composite images and of said tomogram, by virtue of already arbitrarily setting set ratios of the functional images (see rejection of claims 1, 3, and 21).

**Regarding Claim 6**, Wintermark suggests an apparatus according to claim 21, wherein said functional image forming part is capable of specifying part of the regions in said functional image depending upon whether the image data value of said pixel unit lies inside or outside a predetermined range (col. 3, ll. 9 – 21).

**Regarding Claim 7**, Wintermark suggests an apparatus according to claim 21, wherein said functional image forming part determines an arbitrary interested region in said functional image as region of interest in said functional image (col. 9, line 47 – col. 10, line 15).

**Regarding Claim 8**, Wintermark suggests an apparatus according to claim 21, wherein said functional image forming part renders the pixel values of the pixels of the image data on a predetermined display window value level and in a predetermined display window width to be corresponded to conversion coefficients, and determines said gradation color scale based on the conversion coefficients (col. 3, ll. 45 – 54; and col. 4, ll. 25 – 60).

**Regarding Claim 9**, Wintermark suggests an apparatus according to claim 8, wherein said functional image forming part determines the gradation color scale allocated to said functional image depending upon the pixel values of the pixels of the image data for each of RGB and upon various look-up tables to which the conversion coefficients are corresponded (col. 3, ll. 45 – 61).

**Regarding Claim 10**, Wintermark discloses an apparatus according to claim 21, wherein said biological function data is at least one of the blood flow function data as represented by blood volume, blood flow and mean transit time (see rejections of claims 1 and 21).



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**Regarding Claim 22**, Wintermark suggests the functional image display apparatus of claim 21, wherein the biological function data is perfusion data of brain tissue (see rejections of claims 1 and 21).

**Regarding Claim 11**, Wintermark suggests a method of displaying image, said method comprising:

- a step of collecting CT or MR head image data of a person being examined;
- a step of forming a tomogram from said CT or MR head image data;
- a step of calculating at least one biological function data in said tomogram, formed based on said CT or MR head image data, regarding temporal changes in values of the same pixels or section of an organ with passage of time;

- a step of forming at least one function image based on said biological function data;
- a step of forming an operated image by operating said function images together, for forming a composite image by composing said tomogram and at least one of the following images:

- an operated image obtained by operating said functional images together;
- a composite image obtained by composing said functional images together, said operated image, and said functional image; and

- a display step of displaying said functional image, said operated image, said tomogram and said composite image;

wherein the step of at least portions of the regions in said functional image and in said operated image are displayed using different gradation color scale corresponding to the evaluated value of said biological function data, and other regions in said functional image and in said

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operated image are displayed in an arbitrary color which is not included in said gradation color cales, or are displayed transparently, and said portions of the regions in the functional image are displayed by an overlapped display (see rejections of claims 1 and 21).

**Regarding Claim 13**, Wintermark in view of Hossack suggests a method of displaying image according to claim 11, wherein the step of forming said functional image sets to zero the ratio of said functional image in other regions in said functional image (see rejections of Claims 1 and 21).

**Regarding Claim 14**, Wintermark in view of Hossack suggests a method of displaying image according to claim 11, further comprising arbitrarily varying the gradation color scale allocated to said biological function data image (see rejections of claims 1, 21, and 11).

**Regarding Claim 15**, Wintermark in view of Hossack suggests a method of displaying image according to claim 11, further comprising arbitrarily setting the ratios of the functional images in said synthetic images and of said tomogram (see rejection of claims 1, 11, and 21).

**Regarding Claim 16**, Wintermark in view of Hossack suggests a method of displaying image according to claim 12, wherein the step of forming said functional image specifies part of the regions in said functional image depending upon whether the image data value of said pixel unit lies inside or outside a predetermined range (see rejection of claims 1, 3, 11, and 21).

**Regarding Claim 17**, Wintermark suggests a method of displaying image according to claim 12, wherein the step of forming said functional image determines an arbitrary interested region in said functional image as region of interest in said functional image (see rejections of claims 1, 11, and 21).

**Regarding Claim 18**, Wintermark suggests a method of displaying image according to claim 11, wherein the step of forming said functional image renders the pixel values of the pixels of the image data on a predetermined display window value level and in a predetermined display window width to be corresponded to conversion coefficients, and determines said gradation color scale based on the conversion coefficients (col. 3, ll. 45 – 54; and col. 4, ll. 25 – 60).

**Regarding Claim 19**, Wintermark suggests a method of displaying image according to claim 18, wherein the step of forming said functional image determines the gradation color scale allocated to said functional image depending upon the pixel values of the pixels of the image data for each of RGB and upon various look-up tables to which the conversion coefficients are corresponded (col. 3, ll. 45 – 61).

### **Response to Arguments**

**3.** Applicant's arguments, see page 9, filed September 21, 2010, with respect to claims 1, 8, 9, 11, 14, 15, and 21 have been fully considered and are persuasive. The 35 U.S.C. §§101 and 112 rejections of these claims have been withdrawn. However, upon further consideration, a new ground(s) of rejection under 35 U.S.C. §112 have been made.

**4.** Applicant's arguments on pp. 9 – 11, with respect to the prior art rejection(s) of claim(s) claims 1 – 22, have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wintermark et al. (US 6,792,302 B2). Applicant's arguments with respect to the prior art rejections of claims 1- 22 are now moot in view of these new ground(s) of rejection.

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### **Conclusion and Communication**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VANI GUPTA whose telephone number is (571)270-5042. The examiner can normally be reached on Monday - Thursday (8:30 am - 6:00 pm; EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert (Tse) Chen can be reached on 571-272-3672. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/V. G./  
Examiner, Art Unit 3777

/Eric F Winakur/  
Primary Examiner, Art Unit 3777